BACTERIAL BLIGHT OF RYE [1]

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Evidently there is more than one bacterial disease of rye (*Secale cereale*). In an earlier publication by Jones, Johnson, and Reddy [2], a bacterial disease of rye, occurring near Madison, Wis., was referred to, the organism of which was pathogenic not only on rye but also on wheat, spelt, and barley. Both in pathogenicity and in cultural characters the organism was very similar to if not identical with the wheat organism which has been described by Smith, Jones, and Reddy [3] as *Bacterium translucens* var. *undulosum* S. J. & R.

In 1921 a bacterial disease of rye was observed by one of the writers (Reddy) near Bloomington, Ill., where it occurred on the leaves of Rosen (winter) rye. The leaf symptoms of the disease at Bloomington were identical with those previously observed on rye in the vicinity of Madison, Wis. In both cases, blotch-like and stripe-like water-soaked lesions (Pl. 1) were noted, very similar to those described by Jones, Johnson, and Reddy [4] for the bacterial blight of barley. The rather conspicuous exudate which occurs on barley and wheat has also been noted on rye.

Isolations made from the Bloomington collections yielded a yellow organism to all appearances identical with the rye organism previously referred to. In inoculations on rye, wheat, barley, and oats this new rye organism proved to be pathogenic only on rye. In all of these inoculation experiments the spray method was employed as previously described for the barley organism.

At Bloomington, Ill., in 1921, two inoculation experiments were conducted with the new rye organism. In both experiments rye and Marquis (spring) wheat seedlings about 4 inches high, growing in rows in the field, were inoculated. In each case an ample number of plants were left uninoculated as controls. In both of these experiments typical bacterial lesions resulted on the rye, while the wheat seedlings and all of the controls remained free from bacterial infection. The typical rye organism was recovered from the rye lesions, and it proved pathogenic in subsequent inoculation experiments.

At Madison, Wis., in 1921 and 1922, two inoculation experiments were conducted. In each, both the new rye organism and the barley organism, *Bacterium translucens*, were used as inocula. In both experiments, parallel inoculations with the two organisms were made in the greenhouse on rye, wheat, barley, and oat plants about 4 inches high. In both series the new rye organism produced typical bacterial lesions only on rye and the barley organism, *B. translucens*, infected only barley as usual. All the uninoculated control plants remained free from bacterial infection.

The morphological characters of the new rye organism were found to be identical with those of *Bacterium translucens* as described by Jones, Johnson, and Reddy.[4]

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[1] Received for publication April 19, 1924—issued Nov., 1924. These investigations were conducted in cooperation with the Wisconsin Agricultural Experiment Station, Madison, Wis., and the Funk Bros. Seed Co., Bloomington Ill.

[2] JONES, L. R., JOHNSON, A. G., and REDDY, C. S. BACTERIAL BLIGHTS OF BARLEY AND CERTAIN OTHER CEREALS. Science 44: 432-433, 1916.

[3] SMITH, E. F., JONES, L. R., and REDDY, C. S. THE BLACK CHAFF OF WHEAT. Science 50: 48, 1919.

[4] JONES, L. R., JOHNSON, A. G., and REDDY, C. S. BACTERIAL BLIGHT OF BARLEY. Jour. Agr. Research 11: 625-644, illus. 1917.

The cultural characters were studied in direct comparison with those of *Bacterium translucens*, that is, the two organisms were run in parallel series. In all of these studies of cultural characters the two organisms were found to be identical. The results were the same as given for the barley organism, *B. translucens*, except in one detail as follows: In the case of action on starch, it was previously reported for the barley organism, *B. translucens*, that there was "no evidence of diastatic action on potato starch * * *." In the present investigations, using the more delicate methods described by Conn et al.,[5] it was found that both the barley organisms, *B. translucens*, and the new rye organism produced a very feeble diastatic action on starch noticeable for approximately half an hour after the iodin solution had been applied. After that time it was difficult to detect any halo about the colonies. There was possibly a slight dextrine reaction.

In addition, certain special studies were made on indicator media. Saccharine media containing brom cresol purple and cresol red, respectively, were prepared according to the recommendations of Conn et al.[5]

The new rye organism and the barley organism, *Bacterium translucens*, were used in parallel series. Eight agar slants of each medium were inoculated with each organism respectively, and four slants of each medium were left uninoculated. Both organisms changed the color of each medium to the same degree in the same length of time. Alkaline reactions were produced in all of these media as follows: Pronounced in those containing lactose, maltose, mannit, or glycerine; less pronounced in those containing dextrose; and still less pronounced in those containing saccharose.

On the basis of these studies it is evident that the new rye organism is identical with *B. translucens* and the previously described variety, *B. translucens undulosum*, both in morphological characters and in physiological characters in artificial culture media but differs from both in pathogenicity. Hence, the new rye organism is here designated a new variety of *B. translucens* as follows:

Bacterium translucens secalis n. var.

In morphology and in artificial culture this variety is identical with *Bacterium translucens* and *B. translucens undulosum*.

Bacterium translucens infects only barley.

Bacterium translucens undulosum infects wheat, barley, rye, and spelt.

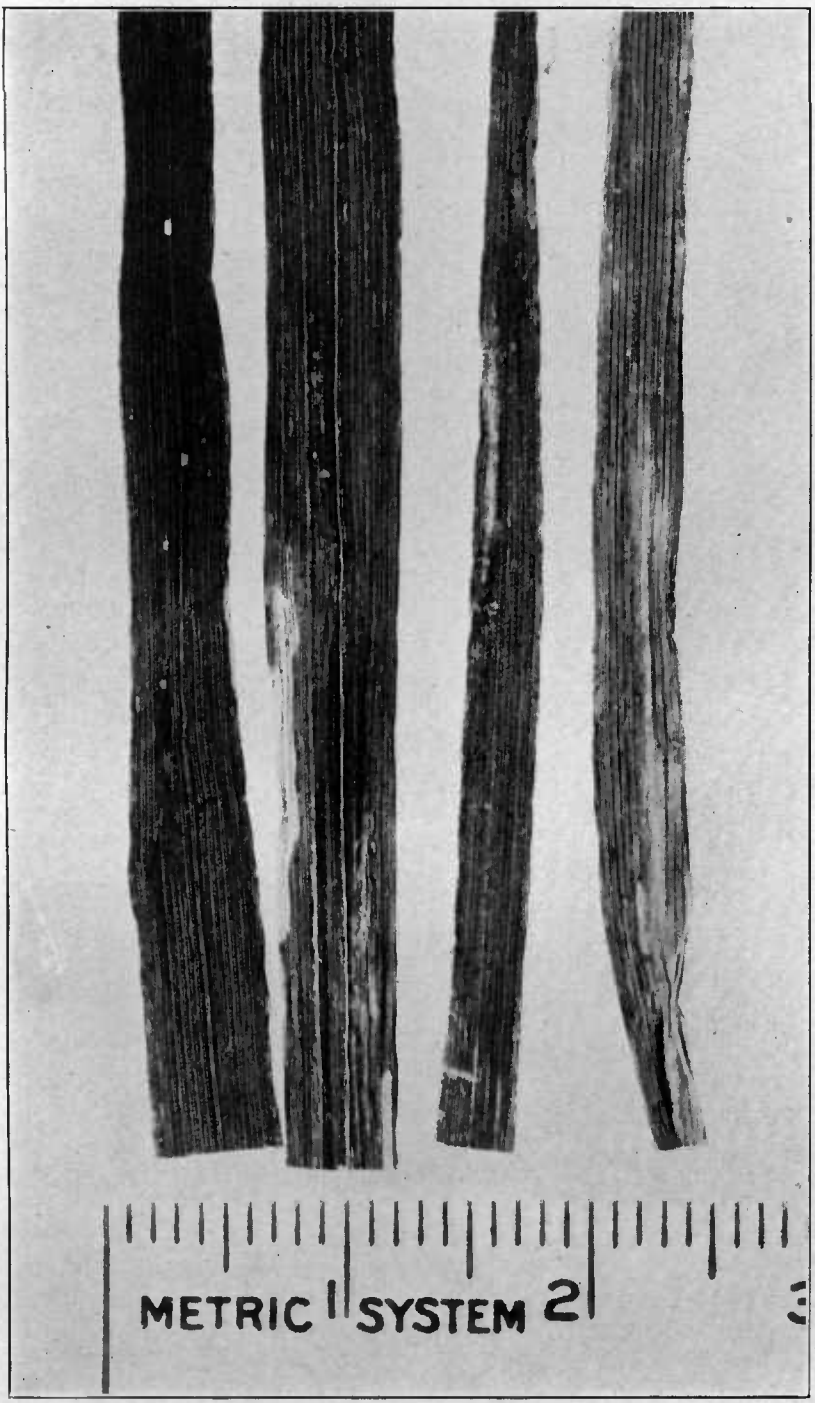
Bacterium translucens secalis infects only rye.

Type locality: Bloomington, Ill.

[5] CONN, H. J., and others. REPORT OF THE COMMITTEE ON THE DESCRIPTIVE CHART FOR 1919. Journ. Bact. 5: 127-143; 315-319. 1920.

PLATE 1.

Bacterial lesions from natural infections on leaf-blades of rye. Specimens collected near Bloomington, Ill., in 1921.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